Stockholms universitet

Universitetslektor i statistik
Senior Lecturer in Statistics
Referensnummer: SU 612-2455-09

1 Ansökningsbrev

Om den sökande till utlyst anställning som universitetslektor begär att i stället anställas som professor, skall den sökande ange detta genom att sätta ett kryss i denna ruta.
Nej

Förnamn
Oleg

Efternamn
Sysoev

Adress bostad
Nämndemansgården 13

Postnummer och ort - bostad
58643 Linköping

Land
Sverige

Adress arbetsplats
Linköpings Universitet

Postnummer och ort - arbetsplats
58183 Linköping

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Telefon
0735673482

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olsys@ida.liu.se

2 CV

Namn
Oleg Sysoev

Födelsedatum (ÅÅÅÅMMDD)
19811008

Kön
Man

Språkkunskaper
Svenska (flytande)
Engelska (flytande)
Ryska (modersmål)

2.2 Examina
Doktorsexamen i Statistik, disputerad 2010-04-16, Linköpings Universitet
M.Sc. i tillämpad matematik, 2004, Moskvas Universitet för Fysik och Teknologi
B.Sc i tillämpad matematik, 2002, Moskvas Universitet för Fysik och Teknologi
Docentkompetens. Bifoga kopia av bevis.

2.3 Utbildningar och anställningar
Fr.o.m. 05/2010 Gästlektor i Statistik, Linköpings Universitet
2005-2010 Doktorand i Statistik, Linköpings Universitet
2004-2005 Senior Customer Support Engineer på NetCracker Technology Corp. registrerade i USA.
Företagsprofil: NetCracker is a leading provider of
Operations Support Systems Solution (OSS) for service providers, cable operators, enterprises
and government agencies.
2003-2004 Java programmerare (deltid) på NetCracker Technology Corp.
2.4 Referenspersoner

3 Publikationer utvalda av den sökande

1.
Burdakov, A. Grimvall and O. Sysoev. Data preordering in generalized PAV algorithm for monotonic regression. Journal of Computational Mathematics. (2006) 24, No. 6, pp. 771-790

My involvement was in: discussion of algorithms, justification of their correctness, study of their complexity, analysis of outcomes and efficient implementation.

2.
O. Burdakov, O. Sysoev, A. Grimvall and M. Hussian. An O(n2) algorithm for isotonic regression. In: G. Di Pillo and M. Roma (Eds) Large-Scale Nonlinear Optimization. Series: Nonconvex Optimization and Its Applications, Springer-Verlag, (2006) 83, pp. 25-33.

My involvement was in: discussion of algorithms, justification of their correctness, study of their complexity, analysis of outcomes and efficient implementation.

3.
M. Hussian, A. Grimvall, O. Burdakov and O. Sysoev. Monotonic regression for the detection of temporal trends in environmental quality data. MATCH Commun. Math. Comput. Chem. (2005) 54, pp. 535-550.

My involvement was in: studies of correct applying monotonic regression algorithms to the environmental data

4.
O. Burdakov, A. Grimvall and O. Sysoev. Generalized PAV algorithm with block refinement for partially ordered monotonic regression. In: A. Feelders and R. Potharst (Eds.) Proceedings of the Workshop on Learning Monotone Models from Data at the European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (2009), pp. 23-37.

My involvement was in: discussion of algorithms, justification of their correctness, study of their complexity, analysis of outcomes and efficient implementation.

5.
O. Burdakov, O. Sysoev, A. Grimvall and M. Hussian (2004). An algorithm for isotonic regression problems. In: The Proceedings of the 4th European Congress of Computational Methods in Applied Science and Engineering `ECCOMAS 2004'.

My involvement was in: discussion of algorithms, justification of their correctness, study of their complexity, analysis of outcomes and efficient implementation.

6.
M. Hussian, A. Grimvall, O. Burdakov and O. Sysoev (2004). Monotonic regression for trend assessment of environmental quality data. In: The Proceedings of the 4th European Congress of Computational Methods in Applied Science and Engineering `ECCOMAS 2004'

My involvement was in: studies of correct applying monotonic regression algorithms to the environmental data

7.
O. Sysoev, A. Grimvall, O. Burdakov. Bootstrap Confidence Intervals for large-scale multivariate monotonic regression problems, Submitted to the Journal of Nonparametric Statistics (2010)

I had the main responsibility for the results of this paper.

8.
Sysoev O., Burdakov O., Grimvall A. A Segmentation-Based Algorithm for Large-Scale Monotonic Regression Problems, Submitted to the Journal of Computational Statistics and Data Analysis (2010)

I had the main responsibility for the results of this paper.

9.
O. Sysoev, A. Grimvall, O. Burdakov. Bootstrap estimation of the error term variance in monotonic regression models, Submitted to the Journal of Statistical Computation and Simulation (2010)

I had the main responsibility for the results of this paper.

10.

4 Vetenskapliga meriter

4.1 Beskrivning av den egna vetenskapliga verksamheten (Max 8000 tecken)

My master and doctoral studies were focused on developing statistical and optimizational approaches in the area of Monotonic Regression (MR). MR is a nonparametric method where it is assumed that the response variable should be a monotonic, i.e. increasing or decreasing, function of the explanatory variables. However, even when the nature of the data implies monotonicity, the observed data is often non-monotonic due to observational errors or missing important predictors. The purpose of MR algorithms is to find a monotonic response that is as close as possible in certain sense to the observed response. Applications of MR can be found in the wide range of areas: business, medicine, physics, signal processing etc.

The modern society has accumulated large databases that require statistical analysis. Accordingly, the datasets under consideration in MR can often be very large, i.e. encompassing more than a hundred thousand observations. Such large sets were of our primary interest.

Before research of our group started [me, Oleg Burdakov (Optimization dept.); Anders Grimvall(Statistics dept.); at earliest stage Mohamed Hussian (Statistics dept.)], the best of the existing MR algorithms were able either to solve the MR problem exactly at the cost O(n4), n-number of observations, or give a computationally cheap solution of the bad quality.

When the large sets are involved, the group of exact methods fails to produce a solution. The solution of the other group is of an unsatisfactory quality.

In the period of my master studies, I have joined the group at Linköping University that was created to make research in MR. I was accepted as a person with good knowledge in statistics and optimization that was needed for successful work in this area. We have together developed the first version of an MR algorithm providing a high accuracy solution for a low time. Among other things, I have contributed a lot into the analysis of effectiveness and effective modifications, accuracy analysis, analysis of memory requirements and effective transformation of an observational data set into the MR formulation. In parallel, I have written my master thesis devoted to applying interior point methods to MR problem (in Russian).

Later on, our group has developed several algorithms producing high-accuracy solutions to the MR problem, each of those algorithms has specific range of applicability, altogether covering problems up to (or even more than) a million observations. During the years of studies, various aspects of these algorithms were examined and the results were published in several periodicals. In parallel, methods that perform statistical inference from the given data were developed by employing our algorithms. In particular, our latest achievements allowed to compute bootstrap confidence intervals for a large epidemiological dataset.

My role in the research of our group was increasing with time. In the most recently submitted papers, I had the main responsibility.

4.2 Fullständig publikationsförteckning. Förteckningen kan skrivas in i detta fält eller bifogas under "Bilagor"

O. Burdakov, A. Grimvall and O. Sysoev. Data preordering in generalized PAV algorithm for monotonic regression. Journal of Computational Mathematics. (2006) 24, No. 6, pp. 771-790.

O. Burdakov, O. Sysoev, A. Grimvall and M. Hussian. An O(n2) algorithm for isotonic regression. In: G. Di Pillo and M. Roma (Eds) Large-Scale Nonlinear Optimization. Series: Nonconvex Optimization and Its Applications, Springer-Verlag, (2006) 83, pp. 25-33.

M. Hussian, A. Grimvall, O. Burdakov and O. Sysoev. Monotonic regression for the detection of temporal trends in environmental quality data. MATCH Commun. Math. Comput. Chem. (2005) 54, pp. 535-550.

O. Burdakov, O. Sysoev, A. Grimvall and M. Hussian (2004). An algorithm for isotonic regression problems. In: The Proceedings of the 4th European Congress of Computational Methods in Applied Science and Engineering `ECCOMAS 2004'.

M. Hussian, A. Grimvall, O. Burdakov and O. Sysoev. Monotonic regression for trend assessment of environmental quality data. In: P. Neittaanmaki et al. (Eds.) The Proceedings of the 4th European Congress of Computational Methods in Applied Science and Engineering ECCOMAS 2004 .

O. Burdakov, A. Grimvall and O. Sysoev. Generalized PAV algorithm with block refinement for partially ordered monotonic regression. In: A. Feelders and R. Potharst (Eds.) Proc. of the Workshop on Learning Monotone Models from Data at the European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases. (2009), pp. 23-37.

4.3 Erhållna externa forskningsmedel

4.4 Vetenskapliga utmärkelser, priser, ledamotskap i akademier etc.

4.5 Övriga vetenskapliga meriter
BSc and MSc in applied mathematics with distinction.
Conference participation:
TIES 2006
EUROOPT-OMS 2007
EURISBIS 2009

5 Forskningsplan

5 Forskningsplan (Max 12000 tecken)
My main research interest is developing of computer-intensive methods suitable for extracting of an useful information from large complex datasets. I have planned my research in several directions.

One of the directions is continuation of the work in the monotonic regression area. Such work implies enhancing of the created MR algorithms, developing algorithms for hybrid data (i.e. when the data is monotonic with respect to a subset of variables only), developing algorithms for multidimensional monotonicity testing. Besides, I foresee an immediate scientific result from combining of our approaches with a recently submitted paper of Stout (2009).

Another direction, which I will put the main focus on, is the development of methods applied in Data Mining (DM) for large sets. Starting from combining the methods created by our group with conventional DM techniques such as regression trees and neural networks (I have some ideas already now), I intend to establish a Data Mining research group that would enhance existing and develop new methods in the area of DM, enabling processing large data with many explanatory variables of various types. Because DM was traditionally associated with machine learning, I intend to put the main focus on improving statistical aspects of computing in DM. Due to high interest for the methods extracting interesting information from large data, I expect good opportunities of funding such research from governmental companies and private enterprises.
I believe that my sincere enthusiasm and experience in employing DM methods supported by enough long teaching experience in this area will allow me to achieve interesting results.

6 Pedagogiska meriter

6.1 Pedagogisk egenreflektion (Max 16000 tecken)
In my practice, I got had to teach students from bachelor (kandidat) and master level. In both cases, the focus in my teaching is on increasing communication between teacher and students and also on forcing students to reflect about the matters they study. Besides making lectures as clear as possible, I believe that lectures should be filled with live examples that are interesting for the target group of students. Often, depending on the direction of the studies of the target group it is necessary to take examples from their practice.

Although it is quite difficult to arrange discussion in the area of statistics (because there is almost always one true answer, other answers are false), I organize some discussions that would urge students to give examples from their experience that also concern the matter of discussion. Finally, we consider different aspects of the ideas suggested. As much as it is possible, I organize cooperation between students in terms of group work, even at lectures. At some seminars, groups of students are presenting their results, while other groups work as opponents.

I consider the feedback from students to be on of the most important matters. During the course, I perform continuous course evaluation to regulate the quality and the quantity of the course material.
I think that the personal contact between the teacher and student is quite important, that's why in small groups I try to find personal approach to each student.

I found that many students appreciate to have information about what and how happens in the course. In the course start, I state the rules describing how the course will be held, I give all information about work forms, deadlines, how students get feedback, what happens if deadlines are missed, etc. I try also to give students clear criteria for the examination grades.
6.2 Undervisningserfarenhet
2006-2010 Data Mining (7.5 hp), kandidatprogrammet, undervising på svenska
Jag har utvecklat denna kurs helt och hållet. Största problemet med utvecklingen var att det inte fanns någon liknande kurs i Sverige. Kurs innehåller föreläsningar, labbar, seminarier. Jag var ansvarig för utveckling och undervisning av samtliga moment. Under senaste åren, jag fick examinationsansvar också. Senaste utvärderingen visade 4.53 av 5.

2006-2010 Data Mining and Statistical learning (15 hp), undervisning på engelska.
Den respektive kursen på masternivå. Jag har delvis utvecklat denna kurs och undervisade på en del föreläsningar, labbar och seminarier.

2008,2010 Statistik A (7 hp), kandidatprogrammet, undervisning på svenska.
Jag var ansvarig för undervisning av lektioner.

2010 Statistiska metoder, undervisning på svenska.
Jag var ansvarig för undervisning av lektioner.

2010 Computational statistics (6 hp), på engelska, masternivå.
Föreläsningar, labbar och lektioner har utvecklats av mig helt och hållet. Jag hade ansvar för samtliga moment och examination.
6.3 Handledarerfarenhet

6.4 Pedagogisk utbildning
Teaching in Higher education, Step1: Learning, Instruction and Knowledge.
Teaching in Higher education, Step 2: Designing, Evaluating and Organizing learning.
Grundkurs i SAS software med programmering

6.5 Kursutveckling och utbildningsadministration
se 'undervisningserfarenhet'

6.6 Pedagogiska arbeten och läromedel

6.7 Pedagogiska utmärkelser, priser

6.8 Övriga pedagogiska meriter

7 Administrativa meriter och ledningsuppdrag

7.1 Uppdrag och erfarenhet
Medlem i doktorandrådet.

7.2 Medverkan vid planering och genomförande av konferenser

7.3 Ledarskapsutbildning

7.4 Forsknings- och utbildningspolitiska uppdrag m.m.

8 Meriter från omvärldskontakter och från information om forskning och utvecklingsarbete

8.1 Samverkan med det omgivande samhället

I min forskning i Statistik medverkade jag med Oleg Burdakov (Matematiska institutionen, Linköpings Universitet) och John Carstensen (Institution för Medicin och Hälsa, Linköpings Univesitet). Med John tillämpade vi monotona regressionsmodeller i epidemiologiska studier.

8.2 Information om forskning och utvecklingsarbete

9 Personliga egenskaper

9 Personliga egenskaper (max 4500 tecken)

Jag tror att jag är en utåtriktad, sällskaplig person med tillräckligt goda kunskaper och viljan att arbeta hårt för att uppnå ett önskat resultat. Jag tycker att undervisningen är lika rolig som forskningen och därför försöker jag tillämpa de moderna pedagogiska teknikerna för att göra mina kurser intressanta och nyttiga. Min åsikt är att studenterna skulle utbildas på så sätt att de får direkt nytta av deras utbildning i arbetslivet och jag har mycket idéer om hur man kan göra det till verklighet.

Jag tycker om att arbeta i grupp fast det inte finns några problem för mig att arbeta självständigt. Jag tror att jag har tillräckligt god planerings och kommunikationsförmåga. Jag uppfattar mig som en självständig forskare som kan leda en verksamhet om det finns utrymme och behov för det.

10 Bilagor

Bevis endast avseende högsta examen (punkt 2.2 Examina)
examen.pdf
Bevis avseende högskolepedagogisk utbildning (punkt 6.4 Pedagogisk utbildning)
pedagogik.pdf
Skriftliga utlåtanden från prefekt eller studierektor med en kvalitativ bedömning av den pedagogiska skickligheten bör bifogas, max. 2 st (punkt 6.9 Värdering av pedagogiska insatser): Första utlåtande
utvard.pdf